

HARPER ENGINEERING, Inc.

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STRUCTURAL EVALUATION LETTER

SITE INFORMATION

Site Name: Avery & 33
Site Type: Monopole
Site Address: 6430 Shier-Rings Road, Dublin, Ohio 43016
Verizon Site No.: CLMB118
HPE Site No.: 9-151-299 (Rev.1)

CURRENT WIND CRITERIA

1. Meets Ohio Building Code 2011/IBC 2009.
2. ANSI/TIA/EIA-222-G - Code.

DATA SOURCES

1. Verizon RF information sheet dated 12/02/2015.
2. Site photos dated 11/07/2015.
3. Previous structural analysis by EEI dated 12/19/2012.
4. Previous structural analysis and reinforcing drawings by PJF dated 09/17/2014.



PROPOSED MODIFICATIONS

1. Replace twelve (12) existing panel antennas with: twelve (12) SBNHH-1D65C panel antennas 130 ft. elevation.
2. Remove three (3) existing RRH's and install nine (9) new RRH's behind the new antennas.
3. Install one (1) new OVP distribution box on a new pipe mount at 132 ft. elevation.
4. Install one (1) new 1 5/8" dia. Hybrid cable to the new OVP box.

ASSUMPTIONS

1. Existing structure is in good condition and without any structural defects.
2. The original structural design was performed in accordance with the Telecommunication Industry Association standard TIA/EIA 222 and governing building code.

TOWER LOADING:

| Elev. | Antenna loading | Coax | Carrier |
|---------|--|--|---------|
| 132 ft. | (2) OVP boxes. (9) RRH's. | (2) 1 5/8" Hybrid cables (Outside) | Verizon |
| 130 ft. | (12) SBNHH-1D65C panel antennas. (1) Low profile platform. | (13) LDF5 coax cables (Inside) | |
| 109 ft. | (12) SBNHH-1D65C panel antennas. (2) OVP Distribution boxes. (6) TMA. (9) RRH's. (1) Low profile platform. | (12) 7/8" dia. (Inside) (1) 3/8" dia. Fiber (Inside) (1) 3/4" dia. DC power (Inside) | AT&T |

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PLANNING

HARPER ENGINEERING, Inc.

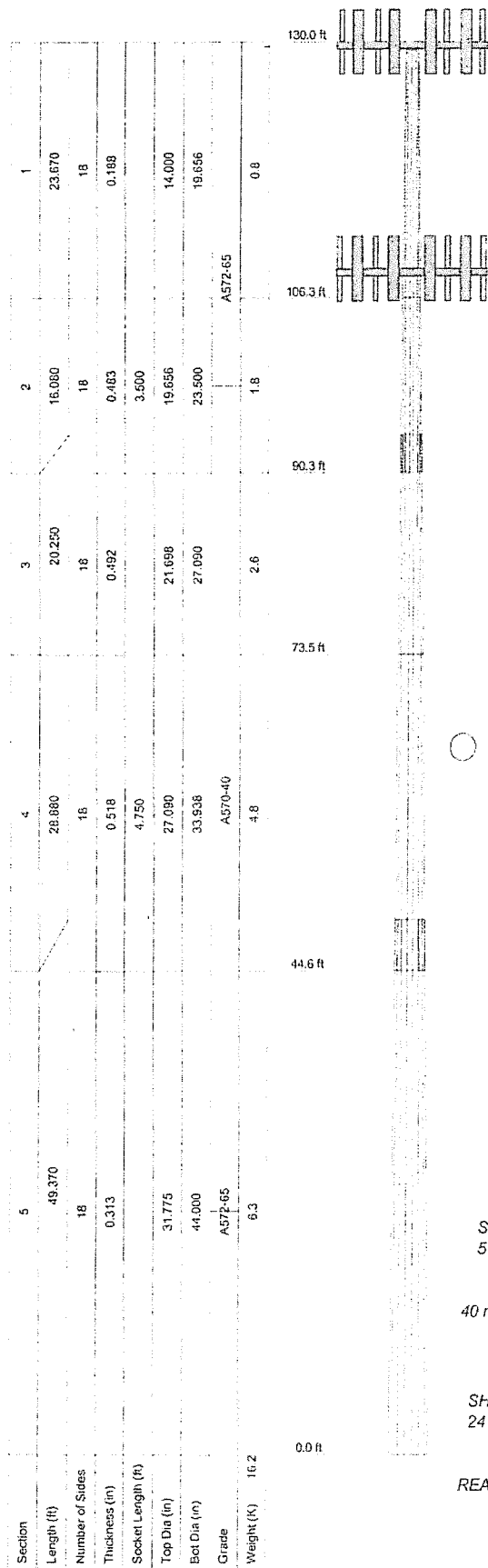
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CONCLUSION

Harper Engineering performed a structural analysis of the existing 130 ft. monopole using TIA/EIA-222-G Standard with above tower loading and tower reinforcing as shown on PJF reinforcing drawings. The results show that the tower is loaded to 95.3 % capacity. Base reactions are within foundation capacity limits calculated from PJF on previous structural analysis. Therefore Harper Engineering can conclude that the existing monopole and foundation are adequate to support proposed Verizon modifications.

ATTACHMENTS

1. Harper Engineering, Inc. Structural Analysis Report.
2. Previous structural analysis and reinforcing drawings by PJF dated 09/17/2014.



DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|------------------------------------|-----------|---|-----------|
| (3) RRH (Verizon) | 132 | (4) SBNHH-1D65C (ATI) | 109 |
| (3) RRH (Verizon) | 132 | (4) SBNHH-1D65C (ATI) | 109 |
| (2) OVP box (Verizon) | 132 | (3) RRH (ATI) | 109 |
| (2) 3' x 3.5" Pipe Mount (Verizon) | 132 | (3) RRH (ATI) | 109 |
| (3) RRH (Verizon) | 130 | (3) RRH (ATI) | 109 |
| PIROD 15' Top Mounted Platform | 130 | (2) TMA's (ATI) | 109 |
| (4) SBNHH-1D65C (Verizon) | 130 | (2) TMA's (ATI) | 109 |
| (4) SBNHH-1D65C (Verizon) | 130 | (2) TMA's (ATI) | 109 |
| (4) SBNHH-1D65C (Verizon) | 130 | PIROD 13' Platform w/handrills (Monopole) | 109 |
| (4) SBNHH-1D65C (ATI) | 109 | | |

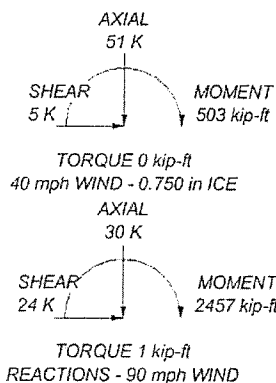
MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---------|--------|--------|---------|--------|--------|
| A572-65 | 65 ksi | 80 ksi | A570-40 | 40 ksi | 55 ksi |

TOWER DESIGN NOTES

1. Tower is located in Franklin County, Ohio.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 95.3%

ALL REACTIONS
ARE FACTORED



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| | | | | |
|-----------------|-----------------------------|-----------------|----------------------|--------|
| Job: CLMB118 | Project: 09-151-299 (Rev.1) | Client: Verizon | Drawn by: A. Hebovia | App'd: |
| Code: TIA-222-G | Date: 12/18/15 | Scale: NTS | Dwg No. E-1 | |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
| tnxTower Harper Engineering, Inc. 815 Superior Ave., Suite 1514 Cleveland, OH 44114 Phone: (216) 344-3855 FAX: (216) 344-3856 | Job | CLMB118 | Page | 1 of 10 |
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| | Client | Verizon | Designed by | A.Hebovia |

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Franklin County, Ohio.

Basic wind speed of 90 mph.

Structure Class II.

Exposure Category C..

Topographic Category 1.

Crest Height 0.000 ft.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 40 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

| Section | Elevation ft | Section Length ft | Splice Length ft | Number of Sides | Top Diameter in | Bottom Diameter in | Wall Thickness in | Bend Radius in | Pole Grade |
|---------|-----------------|-------------------------|------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------|---------------------|
| L1 | 130.000-106.330 | 23.670 | 0.000 | 18 | 14.000 | 19.656 | 0.188 | 0.750 | A572-65 (65 ksi) |
| L2 | 106.330-90.250 | 16.080 | 3.500 | 18 | 19.656 | 23.500 | 0.483 | 1.932 | A570-40 (40 ksi) |
| L3 | 90.250-73.500 | 20.250 | 0.000 | 18 | 21.698 | 27.090 | 0.492 | 1.968 | A570-40 (40 ksi) |
| L4 | 73.500-44.620 | 28.880 | 4.750 | 18 | 27.090 | 33.938 | 0.518 | 2.072 | A570-40 (40 ksi) |
| L5 | 44.620-0.000 | 49.370 | | 18 | 31.775 | 44.000 | 0.313 | 1.250 | A572-65 (65 ksi) |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | It/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|-------------------------|---------|--------|
| L1 | 14.216 | 8.220 | 198.136 | 4.903 | 7.112 | 27.859 | 396.532 | 4.111 | 2.134 | 11.381 |
| | 19.959 | 11.586 | 554.826 | 6.911 | 9.985 | 55.564 | 1110.381 | 5.794 | 3.129 | 16.691 |
| L2 | 19.959 | 29.387 | 1364.873 | 6.807 | 9.985 | 136.688 | 2731.542 | 14.696 | 2.610 | 5.404 |
| | 23.863 | 35.279 | 2361.312 | 8.171 | 11.938 | 197.798 | 4725.731 | 17.643 | 3.286 | 6.805 |
| L3 | 22.979 | 33.121 | 1881.656 | 7.528 | 11.022 | 170.713 | 3765.789 | 16.564 | 2.953 | 6 |
| | 27.508 | 41.544 | 3713.085 | 9.442 | 13.762 | 269.814 | 7431.056 | 20.776 | 3.902 | 7.929 |
| L4 | 27.508 | 43.688 | 3897.104 | 9.433 | 13.762 | 283.185 | 7799.335 | 21.848 | 3.856 | 7.444 |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
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| | Client | Verizon | Designed by | A.Hebovia |

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | Iu/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|-------------------------|---------|--------|
| L5 | 34.461 | 54.946 | 7753.075 | 11.864 | 17.240 | 449.708 | 15516.351 | 27.478 | 5.061 | 9.771 |
| | 33.460 | 31.207 | 3902.873 | 11.169 | 16.142 | 241.786 | 7810.882 | 15.607 | 5.042 | 16.136 |
| | 44.679 | 43.333 | 10448.789 | 15.509 | 22.352 | 467.466 | 20911.327 | 21.670 | 7.194 | 23.021 |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A _r | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals in | Double Angle Stitch Bolt Spacing Horizontals in |
|------------------------|------------------------------|---------------------|--------------|----------------------------------|-------------------------------------|--------------|---|---|
| ft | ft ² | in | | | | | | |
| L1 130.000- 106.330 | | | | 1 | 1 | 1 | | |
| L2 106.330- 90.250 | | | | 1 | 1 | 1 | | |
| L3 90.250- 73.500 | | | | 1 | 1 | 1 | | |
| L4 73.500- 44.620 | | | | 1 | 1 | 1 | | |
| L5 44.620- 0.000 | | | | 1 | 1 | 1 | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | | C _A A _A ft ² /ft | Weight klf |
|---|-------------------|-----------------|--------------------|------------------|----------------------|--------------------------------|----|------------------------------|--|-------------------------|
| AVA7-50 (1- 5/8 LOW DENS. FOAM) (Verizon) | C | No | Inside Pole | 130.000 - 8.000 | 0.000 | 0 | 13 | No Ice 1/2" Ice 1" Ice | 0.000 0.000 0.000 | 0.001 0.001 0.001 |
| 1 5/8" Hybrid cable (Verizon) 7/8 (AT&T) | A | No | CaAa (Out Of Face) | 130.000 - 8.000 | 2.000 | 0 | 2 | No Ice 1/2" Ice 1" Ice | 0.000 0.000 0.000 | 0.001 0.001 0.001 |
| | B | No | Inside Pole | 109.000 - 8.000 | 0.000 | 0 | 12 | No Ice 1/2" Ice 1" Ice | 0.000 0.000 0.000 | 0.001 0.001 0.001 |
| 3/8 Fiber (AT&T) | B | No | Inside Pole | 109.000 - 8.000 | 0.000 | 0 | 1 | No Ice 1/2" Ice 1" Ice | 0.000 0.000 0.000 | 0.000 0.000 0.000 |
| 3/4 DC Power (AT&T) | B | No | Inside Pole | 109.000 - 8.000 | 0.000 | 0 | 3 | No Ice 1/2" Ice 1" Ice | 0.000 0.000 0.000 | 0.000 0.000 0.000 |
| 1 1/4" Flat reinforcement | C | No | CaAa (Out Of Face) | 76.250 - 46.250 | 0.000 | 0 | 1 | No Ice 1/2" Ice 1" Ice | 0.200 0.300 0.400 | 0.003 0.004 0.006 |
| 1" Flat reinforcement | C | No | CaAa (Out Of Face) | 106.250 - 76.250 | 0.000 | 0 | 1 | No Ice 1/2" Ice 1" Ice | 0.150 0.250 0.350 | 0.001 0.002 0.003 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight K |
|------------------|--------------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
|------------------|--------------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|

| | | | | |
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| Tower Section | Tower Elevation ft | Face | A_R ft ² | A_F ft ² | C_{AA} In Face ft ² | C_{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|------|--------------------------|--------------------------|--|---|-------------|
| L1 | 130.000-106.330 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.049 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.222 |
| L2 | 106.330-90.250 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.033 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.128 |
| | | C | 0.000 | 0.000 | 0.000 | 2.400 | 0.162 |
| L3 | 90.250-73.500 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.133 |
| | | C | 0.000 | 0.000 | 0.000 | 2.650 | 0.174 |
| L4 | 73.500-44.620 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.060 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.229 |
| | | C | 0.000 | 0.000 | 0.000 | 5.450 | 0.347 |
| L5 | 44.620-0.000 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.076 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.290 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.343 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A_R ft ² | A_F ft ² | C_{AA} In Face ft ² | C_{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|--------------------------|--------------------------|--|---|-------------|
| L1 | 130.000-106.330 | A | 1.703 | 0.000 | 0.000 | 0.000 | 0.000 | 0.049 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.222 |
| L2 | 106.330-90.250 | A | 1.673 | 0.000 | 0.000 | 0.000 | 0.000 | 0.033 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.128 |
| | | C | | 0.000 | 0.000 | 0.000 | 7.752 | 0.262 |
| L3 | 90.250-73.500 | A | 1.642 | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.133 |
| | | C | | 0.000 | 0.000 | 0.000 | 8.253 | 0.283 |
| L4 | 73.500-44.620 | A | 1.588 | 0.000 | 0.000 | 0.000 | 0.000 | 0.060 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.229 |
| | | C | | 0.000 | 0.000 | 0.000 | 14.107 | 0.544 |
| L5 | 44.620-0.000 | A | 1.441 | 0.000 | 0.000 | 0.000 | 0.000 | 0.076 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.290 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.343 |

Feed Line Center of Pressure

| Section | Elevation ft | CP_x in | CP_z in | CP_x Ice in | CP_z Ice in |
|---------|-----------------|--------------|--------------|---------------------|---------------------|
| L1 | 130.000-106.330 | 0.000 | 0.000 | 0.000 | 0.000 |
| L2 | 106.330-90.250 | -0.177 | 0.102 | -0.436 | 0.251 |
| L3 | 90.250-73.500 | -0.189 | 0.109 | -0.462 | 0.267 |
| L4 | 73.500-44.620 | -0.224 | 0.129 | -0.481 | 0.278 |
| L5 | 44.620-0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

| | | | | |
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Shielding Factor Ka

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|-------------|-------------------------|-----------------------|--------------------|
|---------------|----------------------|-------------|-------------------------|-----------------------|--------------------|

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K |
|---|-------------|-------------|--|-------------------------|-----------------|----------|--|---|-------------|
| PiROD 15' Top Mounted Platform | C | None | | 0.000 | 130.000 | No Ice | 33.800 | 33.800 | 2.043 |
| | | | | | | 1/2" Ice | 43.600 | 43.600 | 2.748 |
| | | | | | | 1" Ice | 53.400 | 53.400 | 3.453 |
| (4) SBNHH-1D65C (Verizon) | A | From Face | 4.000 0.000 0.000 | 0.000 | 130.000 | No Ice | 11.445 | 7.696 | 0.060 |
| | | | | | | 1/2" Ice | 12.064 | 8.289 | 0.126 |
| | | | | | | 1" Ice | 12.689 | 8.889 | 0.199 |
| (4) SBNHH-1D65C (Verizon) | B | From Face | 4.000 0.000 0.000 | 0.000 | 130.000 | No Ice | 11.445 | 7.696 | 0.060 |
| | | | | | | 1/2" Ice | 12.064 | 8.289 | 0.126 |
| | | | | | | 1" Ice | 12.689 | 8.889 | 0.199 |
| (4) SBNHH-1D65C (Verizon) | C | From Face | 4.000 0.000 0.000 | 0.000 | 130.000 | No Ice | 11.445 | 7.696 | 0.060 |
| | | | | | | 1/2" Ice | 12.064 | 8.289 | 0.126 |
| | | | | | | 1" Ice | 12.689 | 8.889 | 0.199 |
| (3) RRH (Verizon) | A | From Face | 3.000 0.000 0.000 | 0.000 | 130.000 | No Ice | 2.119 | 1.774 | 0.058 |
| | | | | | | 1/2" Ice | 2.325 | 1.969 | 0.075 |
| | | | | | | 1" Ice | 2.539 | 2.172 | 0.096 |
| (3) RRH (Verizon) | B | From Face | 3.000 0.000 0.000 | 0.000 | 132.000 | No Ice | 2.119 | 1.774 | 0.058 |
| | | | | | | 1/2" Ice | 2.325 | 1.969 | 0.075 |
| | | | | | | 1" Ice | 2.539 | 2.172 | 0.096 |
| (3) RRH (Verizon) | C | From Face | 3.000 0.000 0.000 | 0.000 | 132.000 | No Ice | 2.119 | 1.774 | 0.058 |
| | | | | | | 1/2" Ice | 2.325 | 1.969 | 0.075 |
| | | | | | | 1" Ice | 2.539 | 2.172 | 0.096 |
| (2) OVP box (Verizon) | C | From Face | 2.000 0.000 0.000 | 0.000 | 132.000 | No Ice | 1.167 | 0.467 | 0.004 |
| | | | | | | 1/2" Ice | 1.314 | 0.575 | 0.012 |
| | | | | | | 1" Ice | 1.469 | 0.691 | 0.021 |
| PiROD 13' Platform w/handrails (Monopole) | C | None | | 0.000 | 109.000 | No Ice | 31.300 | 31.300 | 1.822 |
| | | | | | | 1/2" Ice | 40.200 | 40.200 | 2.452 |
| | | | | | | 1" Ice | 49.100 | 49.100 | 3.082 |
| (4) SBNHH-1D65C (AT&T) | A | From Face | 4.000 0.000 0.000 | 0.000 | 109.000 | No Ice | 11.445 | 7.696 | 0.060 |
| | | | | | | 1/2" Ice | 12.064 | 8.289 | 0.126 |
| | | | | | | 1" Ice | 12.689 | 8.889 | 0.199 |
| (4) SBNHH-1D65C (AT&T) | B | From Face | 4.000 0.000 0.000 | 0.000 | 109.000 | No Ice | 11.445 | 7.696 | 0.060 |
| | | | | | | 1/2" Ice | 12.064 | 8.289 | 0.126 |
| | | | | | | 1" Ice | 12.689 | 8.889 | 0.199 |
| (4) SBNHH-1D65C (AT&T) | C | From Face | 4.000 0.000 0.000 | 0.000 | 109.000 | No Ice | 11.445 | 7.696 | 0.060 |
| | | | | | | 1/2" Ice | 12.064 | 8.289 | 0.126 |
| | | | | | | 1" Ice | 12.689 | 8.889 | 0.199 |
| (3) RRH (AT&T) | A | From Face | 3.000 0.000 0.000 | 0.000 | 109.000 | No Ice | 2.119 | 1.774 | 0.058 |
| | | | | | | 1/2" Ice | 2.325 | 1.969 | 0.075 |
| | | | | | | 1" Ice | 2.539 | 2.172 | 0.096 |
| (3) RRH (AT&T) | B | From Face | 3.000 0.000 0.000 | 0.000 | 109.000 | No Ice | 2.119 | 1.774 | 0.058 |
| | | | | | | 1/2" Ice | 2.325 | 1.969 | 0.075 |
| | | | | | | 1" Ice | 2.539 | 2.172 | 0.096 |
| (3) RRH (AT&T) | C | From Face | 3.000 0.000 0.000 | 0.000 | 109.000 | No Ice | 2.119 | 1.774 | 0.058 |
| | | | | | | 1/2" Ice | 2.325 | 1.969 | 0.075 |
| | | | | | | 1" Ice | 2.539 | 2.172 | 0.096 |
| (2) TMA's (AT&T) | A | From Face | 3.000 0.000 | 0.000 | 109.000 | No Ice | 1.167 | 0.467 | 0.004 |
| | | | | | | 1/2" Ice | 1.314 | 0.575 | 0.012 |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
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| | Project | 09-151-299 (Rev.1) | Date | 10:36:23 12/18/15 |
| | Client | Verizon | Designed by | A.Hebovia |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight K |
|---------------------------------------|-------------------|----------------|---|----------------------------|-----------------|----------|---|--|-------------|
| (2) TMA's (AT&T) | B | From Face | 0.000 | 0.000 | 109.000 | 1" Ice | 1.469 | 0.691 | 0.021 |
| | | | 3.000 | | | No Ice | 1.167 | 0.467 | 0.004 |
| | | | 0.000 | | | 1/2" Ice | 1.314 | 0.575 | 0.012 |
| | | | 0.000 | | | 1" Ice | 1.469 | 0.691 | 0.021 |
| (2) TMA's (AT&T) | C | From Face | 3.000 | 0.000 | 109.000 | No Ice | 1.167 | 0.467 | 0.004 |
| | | | 0.000 | | | 1/2" Ice | 1.314 | 0.575 | 0.012 |
| | | | 0.000 | | | 1" Ice | 1.469 | 0.691 | 0.021 |
| | | | 0.000 | | | No Ice | 0.764 | 0.764 | 0.040 |
| (2) 3' x 3.5" Pipe Mount (Verizon) | C | From Face | 2.000 | 0.000 | 132.000 | 1/2" Ice | 0.956 | 0.956 | 0.048 |
| | | | 0.000 | | | 1" Ice | 1.161 | 1.161 | 0.058 |
| | | | 0.000 | | | | | | |

Load Combinations

| Comb. No. | Description |
|--------------|--|
| 1 | Dead Only |
| 2 | 1.2 Dead+1.6 Wind 0 deg - No Ice |
| 3 | 0.9 Dead+1.6 Wind 0 deg - No Ice |
| 4 | 1.2 Dead+1.6 Wind 90 deg - No Ice |
| 5 | 0.9 Dead+1.6 Wind 90 deg - No Ice |
| 6 | 1.2 Dead+1.6 Wind 180 deg - No Ice |
| 7 | 0.9 Dead+1.6 Wind 180 deg - No Ice |
| 8 | 1.2 Dead+1.0 Ice+1.0 Temp |
| 9 | 1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp |
| 10 | 1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp |
| 11 | 1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp |
| 12 | Dead+Wind 0 deg - Service |
| 13 | Dead+Wind 90 deg - Service |
| 14 | Dead+Wind 180 deg - Service |

Maximum Member Forces

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Axial K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|----------------|-----------------|-------------------|------------------|-----------------------|------------|--------------------------------|--------------------------------|
| L1 | 130 - 106.33 | Pole | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 8 | -22.437 | 0.008 | -0.664 |
| | | | Max. Mx | 4 | -6.965 | -232.353 | -0.169 |
| | | | Max. My | 6 | -6.946 | 0.052 | -234.360 |
| | | | Max. Vy | 4 | 17.345 | -232.353 | -0.169 |
| | | | Max. Vx | 6 | 17.414 | 0.052 | -234.360 |
| | | | Max. Torque | 4 | | | -0.329 |
| | | | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| L2 | 106.33 - 90.25 | Pole | Max. Compression | 8 | -25.050 | 0.077 | -0.676 |
| | | | Max. Mx | 4 | -9.029 | -455.669 | -0.153 |
| | | | Max. My | 6 | -9.013 | 0.062 | -458.530 |
| | | | Max. Vy | 4 | 18.183 | -455.669 | -0.153 |
| | | | Max. Vx | 6 | 18.252 | 0.062 | -458.530 |
| | | | | | | | |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
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| | Client | Verizon | Designed by | A.Hebovia |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Axial K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L3 | 90.25 - 73.5 | Pole | Max. Torque | 4 | | | -0.363 |
| | | | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 8 | -30.513 | 0.213 | -0.703 |
| | | | Max. Mx | 4 | -13.364 | -838.895 | -0.122 |
| | | | Max. My | 6 | -13.351 | 0.085 | -843.153 |
| | | | Max. Vy | 4 | 19.636 | -838.895 | -0.122 |
| | | | Max. Vx | 6 | 19.706 | 0.085 | -843.153 |
| L4 | 73.5 - 44.62 | Pole | Max. Torque | 4 | | | -0.430 |
| | | | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 8 | -37.602 | 0.478 | -0.779 |
| | | | Max. Mx | 4 | -19.120 | -1333.156 | -0.096 |
| | | | Max. My | 6 | -19.110 | 0.168 | -1339.161 |
| | | | Max. Vy | 4 | 21.387 | -1333.156 | -0.096 |
| | | | Max. Vx | 6 | 21.457 | 0.168 | -1339.161 |
| L5 | 44.62 - 0 | Pole | Max. Torque | 4 | | | -0.539 |
| | | | Max Tension | 1 | 0.000 | 0.000 | 0.000 |
| | | | Max. Compression | 8 | -50.978 | 0.530 | -0.652 |
| | | | Max. Mx | 4 | -29.979 | -2447.584 | 0.056 |
| | | | Max. My | 6 | -29.979 | 0.189 | -2456.822 |
| | | | Max. Vy | 4 | 23.532 | -2447.584 | 0.056 |
| | | | Max. Vx | 6 | 23.597 | 0.189 | -2456.822 |
| | | | Max. Torque | 4 | | | -0.562 |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------|------------|-----------------|-----------------|
| Pole | Max. Vert | 11 | 50.978 | 0.000 | -4.766 |
| | Max. H _x | 7 | 22.509 | 0.000 | -23.556 |
| | Max. H _z | 3 | 22.509 | -0.000 | 23.556 |
| | Max. M _x | 2 | 2456.811 | -0.000 | 23.556 |
| | Max. M _z | 4 | 2447.584 | -23.491 | 0.000 |
| | Max. Torsion | 3 | 0.401 | -0.000 | 23.556 |
| | Min. Vert | 5 | 22.509 | -23.491 | 0.000 |
| | Min. H _x | 4 | 30.011 | -23.491 | 0.000 |
| | Min. H _z | 6 | 30.011 | 0.000 | -23.556 |
| | Min. M _x | 6 | -2456.822 | 0.000 | -23.556 |
| | Min. M _z | 11 | -0.610 | 0.000 | -4.766 |
| | Min. Torsion | 4 | -0.560 | -23.491 | 0.000 |

Tower Mast Reaction Summary

| Load Combination | Vertical K | Shear _x K | Shear _z K | Overturning Moment, M _x kip-ft | Overturning Moment, M _z kip-ft | Torque kip-ft |
|-----------------------------------|------------|----------------------|----------------------|---|---|---------------|
| Dead Only | 25.010 | 0.000 | 0.000 | -0.006 | 0.108 | 0.000 |
| 1.2 Dead+1.6 Wind 0 deg - No Ice | 30.011 | 0.000 | -23.556 | -2456.811 | 0.078 | -0.401 |
| 0.9 Dead+1.6 Wind 0 deg - No Ice | 22.509 | 0.000 | -23.556 | -2423.088 | 0.045 | -0.401 |
| 1.2 Dead+1.6 Wind 90 deg - No Ice | 30.011 | 23.491 | -0.000 | -0.056 | -2447.584 | 0.560 |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
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| Load Combination | Vertical K | Shear _x K | Shear _y K | Overturning Moment, M _x kip-ft | Overturning Moment, M _y kip-ft | Torque kip-ft |
|--|---------------|-------------------------|-------------------------|---|---|------------------|
| 0.9 Dead+1.6 Wind 90 deg - No Ice | 22.509 | 23.491 | -0.000 | -0.057 | -2414.037 | 0.550 |
| 1.2 Dead+1.6 Wind 180 deg - No Ice | 30.011 | -0.000 | 23.556 | 2456.822 | 0.189 | 0.414 |
| 0.9 Dead+1.6 Wind 180 deg - No Ice | 22.509 | -0.000 | 23.556 | 2423.096 | 0.153 | 0.414 |
| 1.2 Dead+1.0 Ice+1.0 Temp | 50.978 | -0.000 | 0.000 | 0.652 | 0.530 | -0.000 |
| 1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp | 50.978 | 0.000 | -4.766 | -501.172 | 0.592 | -0.145 |
| 1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp | 50.978 | 4.756 | -0.000 | 0.766 | -499.891 | 0.176 |
| 1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp | 50.978 | -0.000 | 4.766 | 502.723 | 0.610 | 0.145 |
| Dead+Wind 0 deg - Service | 25.010 | 0.000 | -5.855 | -606.871 | 0.101 | 0.001 |
| Dead+Wind 90 deg - Service | 25.010 | 5.838 | -0.000 | -0.010 | -604.498 | 0.082 |
| Dead+Wind 180 deg - Service | 25.010 | -0.000 | 5.855 | 606.879 | 0.128 | -0.000 |

Solution Summary

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 1 | 0.000 | -25.010 | 0.000 | 0.000 | 25.010 | 0.000 | 0.000% |
| 2 | 0.000 | -30.011 | -23.556 | -0.000 | 30.011 | 23.556 | 0.000% |
| 3 | 0.000 | -22.509 | -23.556 | -0.000 | 22.509 | 23.556 | 0.000% |
| 4 | 23.491 | -30.011 | -0.000 | -23.491 | 30.011 | 0.000 | 0.000% |
| 5 | 23.491 | -22.509 | -0.000 | -23.491 | 22.509 | 0.000 | 0.000% |
| 6 | -0.000 | -30.011 | 23.556 | 0.000 | 30.011 | -23.556 | 0.000% |
| 7 | -0.000 | -22.509 | 23.556 | 0.000 | 22.509 | -23.556 | 0.000% |
| 8 | 0.000 | -50.978 | 0.000 | 0.000 | 50.978 | -0.000 | 0.000% |
| 9 | 0.000 | -50.978 | -4.766 | -0.000 | 50.978 | 4.766 | 0.000% |
| 10 | 4.756 | -50.978 | -0.000 | -4.756 | 50.978 | 0.000 | 0.000% |
| 11 | -0.000 | -50.978 | 4.766 | 0.000 | 50.978 | -4.766 | 0.000% |
| 12 | 0.000 | -25.010 | -5.855 | -0.000 | 25.010 | 5.855 | 0.000% |
| 13 | 5.838 | -25.010 | -0.000 | -5.838 | 25.010 | 0.000 | 0.000% |
| 14 | -0.000 | -25.010 | 5.855 | 0.000 | 25.010 | -5.855 | 0.000% |

Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|------------------|------------|------------------|------------------------|-----------------|
| 1 | Yes | 4 | 0.00000001 | 0.00000001 |
| 2 | Yes | 5 | 0.00000001 | 0.00008174 |
| 3 | Yes | 4 | 0.00000001 | 0.00098873 |
| 4 | Yes | 5 | 0.00000001 | 0.00013693 |
| 5 | Yes | 5 | 0.00000001 | 0.00005663 |
| 6 | Yes | 5 | 0.00000001 | 0.00008646 |
| 7 | Yes | 5 | 0.00000001 | 0.00003602 |
| 8 | Yes | 4 | 0.00000001 | 0.00001764 |
| 9 | Yes | 6 | 0.00000001 | 0.00026043 |
| 10 | Yes | 6 | 0.00000001 | 0.00026031 |
| 11 | Yes | 6 | 0.00000001 | 0.00026246 |
| 12 | Yes | 4 | 0.00000001 | 0.00018985 |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
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| | | | | |
|----|-----|---|------------|------------|
| 13 | Yes | 4 | 0.00000001 | 0.00023845 |
| 14 | Yes | 4 | 0.00000001 | 0.00019016 |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------------|-----------------------|-----------|------------|
| L1 | 130 - 106.33 | 30.754 | 14 | 2.204 | 0.003 |
| L2 | 106.33 - 90.25 | 20.710 | 14 | 1.750 | 0.001 |
| L3 | 93.75 - 73.5 | 16.323 | 14 | 1.573 | 0.001 |
| L4 | 73.5 - 44.62 | 10.258 | 14 | 1.265 | 0.000 |
| L5 | 49.37 - 0 | 4.761 | 14 | 0.918 | 0.000 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--|-----------------------|------------------|-----------|------------|------------------------------|
| 132.000 | (3) RRH | 14 | 30.754 | 2.204 | 0.003 | 9759 |
| 130.000 | PiROD 15' Top Mounted Platform | 14 | 30.754 | 2.204 | 0.003 | 9759 |
| 109.000 | PiROD 13' Platform w/handrails (Monopole) | 14 | 21.740 | 1.793 | 0.001 | 2342 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------------|-----------------------|-----------|------------|
| L1 | 130 - 106.33 | 124.233 | 6 | 8.901 | 0.012 |
| L2 | 106.33 - 90.25 | 83.759 | 6 | 7.083 | 0.004 |
| L3 | 93.75 - 73.5 | 66.043 | 6 | 6.370 | 0.003 |
| L4 | 73.5 - 44.62 | 41.524 | 6 | 5.123 | 0.002 |
| L5 | 49.37 - 0 | 19.279 | 6 | 3.718 | 0.001 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--|-----------------------|------------------|-----------|------------|------------------------------|
| 132.000 | (3) RRH | 6 | 124.233 | 8.901 | 0.012 | 2526 |
| 130.000 | PiROD 15' Top Mounted Platform | 6 | 124.233 | 8.901 | 0.012 | 2526 |
| 109.000 | PiROD 13' Platform w/handrails (Monopole) | 6 | 87.914 | 7.255 | 0.005 | 602 |

| | | | | |
|--|---------|--------------------|-------------|-------------------|
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| | Client | Verizon | Designed by | A.Hebovia |

Compression Checks

Pole Design Data

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------------|----------------------|---------|----------------------|------|----------------------|---------------------|-----------------|---------------------------------|
| L1 | 130 - 106.33 (1) | TP19.656x14x0.188 | 23.670 | 0.000 | 0.0 | 11.586 | -6.946 | 852.665 | 0.008 |
| L2 | 106.33 - 90.25 (2) | TP23.5x19.656x0.483 | 16.080 | 0.000 | 0.0 | 33.996 | -9.013 | 1554.320 | 0.006 |
| L3 | 90.25 - 73.5 (3) | TP27.09x21.698x0.492 | 20.250 | 0.000 | 0.0 | 41.544 | -13.351 | 1899.380 | 0.007 |
| L4 | 73.5 - 44.62 (4) | TP33.938x27.09x0.518 | 28.880 | 0.000 | 0.0 | 53.094 | -19.110 | 2427.470 | 0.008 |
| L5 | 44.62 - 0 (5) | TP44x31.775x0.313 | 49.370 | 0.000 | 0.0 | 43.333 | -29.979 | 2898.590 | 0.010 |

Pole Bending Design Data

| Section No. | Elevation ft | Size | M _{ux} kip-ft | ϕM_{ux} kip-ft | Ratio $\frac{M_{ux}}{\phi M_{ux}}$ | M _{uy} kip-ft | ϕM_{uy} kip-ft | Ratio $\frac{M_{uy}}{\phi M_{uy}}$ |
|-------------|-----------------------|----------------------|---------------------------|-------------------------|---------------------------------------|---------------------------|-------------------------|---------------------------------------|
| L1 | 130 - 106.33 (1) | TP19.656x14x0.188 | 234.359 | 340.757 | 0.688 | 0.000 | 340.757 | 0.000 |
| L2 | 106.33 - 90.25 (2) | TP23.5x19.656x0.483 | 458.530 | 699.278 | 0.656 | 0.000 | 699.278 | 0.000 |
| L3 | 90.25 - 73.5 (3) | TP27.09x21.698x0.492 | 843.150 | 1027.992 | 0.820 | 0.000 | 1027.992 | 0.000 |
| L4 | 73.5 - 44.62 (4) | TP33.938x27.09x0.518 | 1339.158 | 1599.000 | 0.837 | 0.000 | 1599.000 | 0.000 |
| L5 | 44.62 - 0 (5) | TP44x31.775x0.313 | 2456.808 | 2605.800 | 0.943 | 0.000 | 2605.800 | 0.000 |

Pole Shear Design Data

| Section No. | Elevation ft | Size | Actual V _u K | ϕV_n K | Ratio $\frac{V_u}{\phi V_n}$ | Actual T _u kip-ft | ϕT_n kip-ft | Ratio $\frac{T_u}{\phi T_n}$ |
|-------------|-----------------------|----------------------|-------------------------------|-----------------|---------------------------------|------------------------------------|----------------------|---------------------------------|
| L1 | 130 - 106.33 (1) | TP19.656x14x0.188 | 17.414 | 426.332 | 0.041 | 0.004 | 682.348 | 0.000 |
| L2 | 106.33 - 90.25 (2) | TP23.5x19.656x0.483 | 18.253 | 777.161 | 0.023 | 0.066 | 1400.267 | 0.000 |
| L3 | 90.25 - 73.5 (3) | TP27.09x21.698x0.492 | 19.706 | 949.691 | 0.021 | 0.184 | 2058.492 | 0.000 |
| L4 | 73.5 - 44.62 (4) | TP33.938x27.09x0.518 | 21.457 | 1213.740 | 0.018 | 0.374 | 3201.908 | 0.000 |
| L5 | 44.62 - 0 (5) | TP44x31.775x0.313 | 23.598 | 1437.410 | 0.016 | 0.401 | 5217.967 | 0.000 |

Pole Interaction Design Data

| | | | | |
|--|----------------|--------------------|--------------------|-------------------|
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| Section No. | Elevation ft | Ratio P_u | Ratio M_{ux} | Ratio M_{uy} | Ratio V_u | Ratio T_u | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|-----------------------|----------------|-------------------|-------------------|----------------|----------------|--------------------------|---------------------------|----------|
| L1 | 130 - 106.33 (1) | 0.008 | 0.688 | 0.000 | 0.041 | 0.000 | 0.698 ✓ | 1.000 | 4.8.2 ✓ |
| L2 | 106.33 - 90.25 (2) | 0.006 | 0.656 | 0.000 | 0.023 | 0.000 | 0.662 ✓ | 1.000 | 4.8.2 ✓ |
| L3 | 90.25 - 73.5 (3) | 0.007 | 0.820 | 0.000 | 0.021 | 0.000 | 0.828 ✓ | 1.000 | 4.8.2 ✓ |
| L4 | 73.5 - 44.62 (4) | 0.008 | 0.837 | 0.000 | 0.018 | 0.000 | 0.846 ✓ | 1.000 | 4.8.2 ✓ |
| L5 | 44.62 - 0 (5) | 0.010 | 0.943 | 0.000 | 0.016 | 0.000 | 0.953 ✓ | 1.000 | 4.8.2 ✓ |

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | ϕP_{allow} K | % Capacity | Pass Fail |
|-------------|-----------------|-------------------|----------------------|---------------------|---------|-----------------------|-----------------|------------------|
| L1 | 130 - 106.33 | Pole | TP19.656x14x0.188 | 1 | -6.946 | 852.665 | 69.8 | Pass |
| L2 | 106.33 - 90.25 | Pole | TP23.5x19.656x0.483 | 2 | -9.013 | 1554.320 | 66.2 | Pass |
| L3 | 90.25 - 73.5 | Pole | TP27.09x21.698x0.492 | 3 | -13.351 | 1899.380 | 82.8 | Pass |
| L4 | 73.5 - 44.62 | Pole | TP33.938x27.09x0.518 | 4 | -19.110 | 2427.470 | 84.6 | Pass |
| L5 | 44.62 - 0 | Pole | TP44x31.775x0.313 | 5 | -29.979 | 2898.590 | 95.3 | Pass |
| | | | | | | | Summary | |
| | | | | | | | Pole (L5) | 95.3 Pass |
| | | | | | | | RATING = | 95.3 Pass |

| TYPE | ELEVATION | TYPE | ELEVATION |
|--------------------------------|-----------|-------------------------------|-----------|
| (4) SBNH-1D655C w/ Mount Pipe | 130 | (3) SBNHH-1D65C w/ Mount Pipe | 109 |
| (4) SBNH-1D6555C w/ Mount Pipe | 130 | (3) SBNHH-1D65C w/ Mount Pipe | 109 |
| (4) SBNH-1D6555C w/ Mount Pipe | 130 | (2) LGP17201 | 109 |
| (2) RRH2X40-07-U | 130 | (2) LGP17201 | 109 |
| (2) RRH2X40-07-U | 130 | (2) LGP17201 | 109 |
| (2) RRH2X40-07-U | 130 | RRH2X40-07L-AT | 109 |
| RRH2X40-AWS | 130 | RRH2X40-07L-AT | 109 |
| RRH2X40-AWS | 130 | RRH2X40-07L-AT | 109 |
| RRH2X40-AWS | 130 | RRH2X60-1900 | 109 |
| RRH2X60-1900 | 130 | RRH2X60-1900 | 109 |
| RRH2X60-1900 | 130 | RRH2X60-1900 | 109 |
| RRH2X60-1900 | 130 | RRH4X25-WCS | 109 |
| RCMDC-3315-PF-48 | 130 | RRH4X25-WCS | 109 |
| RCMDC-3315-PF-48 | 130 | RRH4X25-WCS | 109 |
| RCMDC-3315-PF-48 | 130 | DC6-48-60-18-8F | 109 |
| Platform Mount [LP 601-1] | 130 | DC6-48-60-18-8F | 109 |
| (3) SBNHH-1D65C w/ Mount Pipe | 109 | Platform Mount [LP 302-1] | 109 |

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|-----------------|--------|--------|-----------------|--------|--------|
| A572-65 | 65 ksi | 80 ksi | Reinf 40.70 ksi | 41 ksi | 51 ksi |
| Reinf 40.42 ksi | 40 ksi | 51 ksi | Reinf 41.48 ksi | 41 ksi | 52 ksi |

1. Tower is located in Franklin County, Ohio.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. **TOWER RATING: 99.7%**

AXIAL 55 K

SHEAR 5 K

MOMENT 568 kip-ft

TORQUE 0 kip-ft

40 mph WIND - 0.7500 in ICE


AXIAL 31 K

SHEAR 25 K

MOMENT 2569 kip-ft

TORQUE 1 kip-ft

REACTIONS - 90 mph WIND

| | | | |
|--|--|-------------------------------|-------------------|
|  <p>Paul J. Ford 250 East Broad Street, Suite 600 Columbus, Ohio 43215 Phone: 614.221.6679 FAX: 614.448.4118</p> | Job: <i>130' Monopole (Avery & 33 / Dublin, OH)</i> | | |
| | Project: <i>PJF #38914-0012.001 / Site #CLMB118</i> | | |
| | Client: Verizon Wireless | Drawn by: Kevin Mahlum | App'd: |
| | Code: TIA-222-G | Date: 09/15/14 | Scale: NTS |
| | Path: | | |

Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

| | |
|--------------------|-------|
| BU#: | |
| Site Name: | |
| App #: | |
| Pole Manufacturer: | Other |

Anchor Rod Data

| | | |
|----------------|--------|-----|
| Qty: | 10 | |
| Diam: | 2.25 | in |
| Rod Material: | A615-J | |
| Strength (Fu): | 100 | ksi |
| Yield (Fy): | 75 | ksi |
| Bolt Circle: | 53 | in |

Plate Data

| | | |
|-------------------|-------|-----|
| Diam: | 59 | in |
| Thick: | 1.5 | in |
| Grade: | 60 | ksi |
| Single-Rod B-eff: | 13.97 | in |

Stiffener Data (Welding at both sides)

| | | |
|-------------------------------------|--------|---------------|
| Config: | 3 | * |
| Weld Type: | Fillet | |
| Groove Depth: | 0.5 | <-- Disregard |
| Groove Angle: | 45 | <-- Disregard |
| Fillet H. Weld: | 0.375 | in |
| Fillet V. Weld: | 0.375 | in |
| Width: | 7 | in |
| Height: | 21 | in |
| Thick: | 1 | in |
| Notch: | 0.75 | in |
| Grade: | 50 | ksi |
| Weld str.: | 80 | ksi |
| Clear Space between Stiffeners (b): | 5 | in |

Pole Data

| | | |
|--------------------|--------|--------------|
| Diam: | 44 | in |
| Thick: | 0.3125 | in |
| Grade: | 65 | ksi |
| # of Sides: | 18 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

Reactions

| | | |
|--------------------|------|------------------|
| Mu: | 2569 | ft-kips |
| Axial, Pu: | 31 | kips |
| Shear, Vu: | 25 | kips |
| Eta Factor, η | 0.55 | TIA G (Fig. 4-4) |

If No stiffeners, Criteria: AISC LRFD <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Max Rod (Cu+ Vu/ η): 240.3 Kips
 Allowable Axial, $\Phi \cdot F_u \cdot A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 92.4%

| |
|------------------|
| Stiffened |
| AISC LRFD |
| $\Phi \cdot T_n$ |

Base Plate Results

Base Plate Stress: 11.2 ksi
 Allowable Plate Stress: 32.4 ksi
 Base Plate Stress Ratio: 34.7%

Shear Check Only

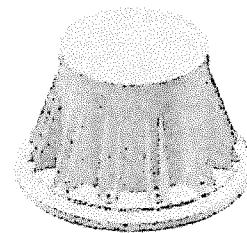
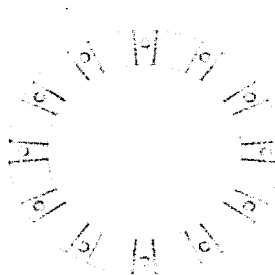
| |
|------------------|
| Stiffened |
| AISC LRFD |
| $\Phi \cdot F_y$ |
| Y.L. Length: |
| N/A, Roark |

Stiffener Results

Horizontal Weld : 83.6%
 Vertical Weld: 28.2%
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: 8.7%
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: 36.7%
 Plate Comp. (AISC Bracket): 38.7%

Pole Results

Pole Punching Shear Check: 11.5%



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

| | Comp. (+) | Tension (-) | |
|-------------------|-----------|-------------|---------------------------|
| Moment, Mu = | 2569.0 | | k-ft |
| Shear, Vu = | 25.0 | | kips |
| Axial Load, Pu1 = | 31.0 | | kips (from 1.2D + 1.6W)* |
| Axial Load, Pu2 = | 23.3 | 0.0 | kips (from 0.9D + 1.6W)** |
| OTMu = | 2581.5 | 0.0 | k-ft @ Ground |

*Axial Load, Pu1 will be used for Soil Compression Analysis.

**Axial Load, Pu2 will be used for Steel Analysis.

Drilled Pier Parameters

| | | |
|----------------------|-------|-------|
| Diameter = | 6.5 | ft |
| Height Above Grade = | 0.5 | ft |
| Depth Below Grade = | 22 | ft |
| fc' = | 4 | ksi |
| εc = | 0.003 | in/in |

| | | |
|-----------------------|--|----|
| Mat Fdn. Cap Width = | | ft |
| Mat Fdn. Cap Length = | | ft |
| Depth Below Grade = | | ft |

Steel Parameters

| | |
|----------------------------|-----------|
| Number of Bars = | 16 |
| Rebar Size = | #11 |
| Rebar Fy = | 60 ksi |
| Rebar MOE = | 29000 ksi |
| Tie Size = | #5 |
| Side Clear Cover to Ties = | 4 in |

Direct Embed Pole Shaft Parameters

| | | |
|---------------------------|--|-----|
| Dia @ Grade = | | in |
| Dia @ Depth Below Grade = | | in |
| Number of Sides = | | |
| Thickness = | | in |
| Fy = | | ksi |
| Backfill Condition = | | |

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

| Layer | Thickness ft | Unit Weight pcf | Cohesion psf | Friction Angle degrees | Soil Type | Ultimate End Bearing psf | Comp. Ult. Skin Friction psf | Tension Ult. Skin Friction psf | Depth ft |
|-------|-----------------|--------------------|-----------------|------------------------------|-----------|--------------------------------|------------------------------------|--------------------------------------|-------------|
| 1 | 3 | 120 | | 15 | Sand | | | | 3 |
| 2 | 9 | 125 | 300 | 20 | Silt | | | | 12 |
| 3 | 11 | 130 | 300 | 25 | Silt | 5000 | | | 23 |
| 4 | 17 | 135 | | 35 | Sand | 5000 | | | 40 |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |

Soil Results: Overturning

| | | |
|-------------------------|---------|----------------|
| Depth to COR = | 15.75 | ft, from Grade |
| Bending Moment, Mu = | 2975.19 | k-ft, from COR |
| Resisting Moment, ΦMn = | 4958.41 | k-ft, from COR |

MOMENT RATIO = 60.0% OK

| | | |
|------------------------|-------|------|
| Shear, Vu = | 25.00 | kips |
| Resisting Shear, ΦVn = | 41.66 | kips |

SHEAR RATIO = 60.0% OK

Soil Results: Uplift

| | | |
|------------------------|-------|------|
| Uplift, Tu = | 0.00 | kips |
| Uplift Capacity, ΦTn = | 91.48 | kips |

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

| | | |
|-----------------------|--------|------|
| Compression, Cu = | 31.00 | kips |
| Comp. Capacity, ΦCn = | 100.94 | kips |

COMPRESSION RATIO = 30.7% OK

Steel Results (ACI 318-05):

| | | |
|----------------------|-------|-------|
| Minimum Steel Area = | 15.93 | sq in |
| Actual Steel Area = | 24.96 | sq in |

| | | |
|--------------------|----------|--------------------------|
| Axial, ΦPn (min) = | -1347.84 | kips, Where ΦMn = 0 k-ft |
| Axial, ΦPn (max) = | 9182.77 | kips, Where ΦMn = 0 k-ft |

| | | |
|------------------|---------|----------------------------|
| Axial Load, Pu = | 45.65 | kips @ 4.50 ft Below Grade |
| Moment, Mu = | 2683.68 | k-ft @ 4.50 ft Below Grade |
| Moment, ΦMn = | 3796.96 | k-ft |

MOMENT RATIO = 70.7% OK

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

SITE NAME
SITE #CLMB118; AVERY & 33

SITE ADDRESS
**1979 WEST DUNDEE RD.
DUBLIN, OHIO 60067
FRANKLIN COUNTY**

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS WAS NOT AVAILABLE AT THE TIME OF THIS DESIGN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. NOTIFY THE EOR AND UNITED ACQUISITION SERVICES IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED.
4. DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
5. THE INTENTION OF THESE DESIGN DOCUMENTS IS TO PROVIDE SUFFICIENT DETAILS AND SPECIFICATIONS SUCH THAT AN EXPERIENCED CONTRACTOR AND/OR FABRICATOR CAN PRODUCE FABRICATION DRAWINGS AND CONSTRUCTION DRAWINGS FOR THEM.

PROJECT CONTACTS:

CLIENT CONTACT:

UNITED ACQUISITION SERVICES, INC.
3960 BROWN PARK DRIVE, SUITE 1, HILLIARD, OH 43026
CONTACT: MATT MORGAN
PH: (614) 850-8966

STRUCTURAL ENGINEER OF RECORD (EOR):

PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: KEVIN MAHLUM AT KMAHLUM@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE ANSI/TIA-222-G-2-2009 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 90 MPH (3-SEC GUST) WITH NO ICE, 40 MPH WITH 3/4 INCH ICE AND 60 MPH SERVICE LOADS, EXPOSURE CATEGORY C.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#38914-0012.004.7700), DATED 9-17-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED STIFFENERS

SHEET INDEX

| SHEET NUMBER | DESCRIPTION |
|--------------|--------------------|
| T-1 | TITLE SHEET |
| S-1 | GENERAL NOTES |
| S-2 | GENERAL NOTES |
| S-3 | AJAX BOLT DETAIL |
| S-4 | MONOPOLE PROFILE |
| S-5 | BASE PLATE DETAILS |



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SITE #CLMB118; AVERY & 33
DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 38914-0012.004.7700

DRAWN BY:

B.M.S.

CHECKED BY:

K.M.M.

APPROVED BY:

DATE:

9-17-2014

TITLE SHEET

T-1

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UNITED ACQUISITION SERVICES, INC. PROJECT: SITE #CLMB118; AVERY & 33; DUBLIN, OHIO
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY UNITED ACQUISITION SERVICES, INC. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF UNITED ACQUISITION SERVICES, INC AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
- THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA-222-G BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
- IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
- THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL OWNER'S CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES.
- THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
- ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
- ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
- ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

- ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
- OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
 - ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
 - THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
- THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL:

- PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL

- CHECK THE STEEL ON THE JOB WITH THE PLANS.
- CHECK MILL CERTIFICATIONS.
- CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
- INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
- CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
- CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
- CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
- CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.

E. WELDING:

- VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
- INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
- APPROVE FIELD WELDING SEQUENCE.
 - A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
 - INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
 - INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
 - VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - REVIEW THE REPORTS BY TESTING LABS.
 - CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. REPORTS:

- COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

- THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
- AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
- RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

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SITE #CLMB118; AVERY & 33
DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 38914-0012.004.7700

DRAWN BY:

B.M.S.

CHECKED BY:

K.M.M.

APPROVED BY:

DATE:
9-17-2014

GENERAL NOTES

S-1

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):

- (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
 - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
 - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
- B. BY THE AMERICAN WELDING SOCIETY (AWS):
- (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
 - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
 3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE A/JAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
 4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
 8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
 9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
 10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 11. FIELD CUTTING OF STEEL:
 - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
 - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
 - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT - (NOT REQUIRED)**F. FOUNDATION WORK - (NOT REQUIRED)****G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)****H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)****I. TOUCH UP OF GALVANIZING**

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
3. THE OWNER SHALL REFER TO TIA-222-G, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TIA-222-G SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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SITE #CLMB118; AVERY & 33
DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 38914-0012.004.7700

DRAWN BY:

B.M.S.

CHECKED BY:

K.M.M.

APPROVED BY:

DATE:

9-17-2014

GENERAL NOTES

S-2

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 ONE-SIDE BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH RED DURABLE SQUIRT MEDIA EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

PART NUMBER: 2DTIM208MGAFSIF

DESCRIPTION: P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

DISTRIBUTOR CONTACT DETAILS:**ALLFASTENERS**

15401 COMMERCE PARK DR.

BROOKPARK, OHIO 44142

PHONE: 440-232-6060

E-MAIL: SALES@ALLFASTENERS.COM

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

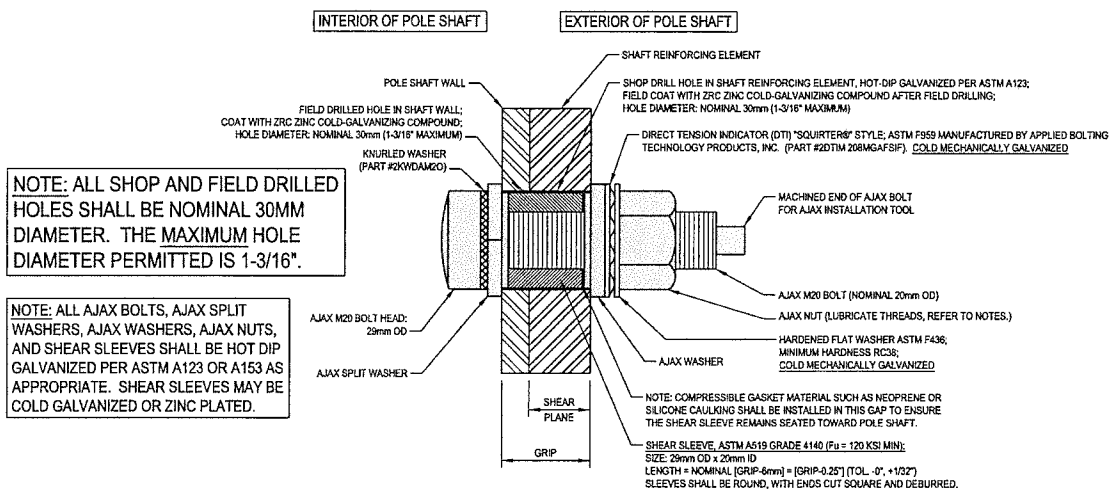
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



TYPICAL AJAX BOLT DETAIL

1
S-3

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SITE #CLMB118; AVERY & 33
DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 38914-0012.004.7700

DRAWN BY:

B.M.S.

CHECKED BY:

K.M.M.

APPROVED BY:

DATE:

9-17-2014

AJAX BOLT DETAIL

S-3

| POLE SPECIFICATIONS | |
|---------------------|-------------------------|
| POLE SHAPE TYPE: | 18-SIDED POLYGON |
| TAPER: | 0.236757 IN/FT |
| SHAFT STEEL: | ASTM A572 GRADE 65 |
| BASE PL. STEEL: | ASTM A571 GRADE 60 |
| ANCHOR RODS: | 2 1/4" |
| | #16J ASTM A615 GRADE 75 |

| SHAFT SECTION DATA | | | | | |
|--------------------|---------------------|----------------------|----------------|----------------------------|----------|
| SHAFT SECTION | SECTION LENGTH (FT) | PLATE THICKNESS (IN) | LAP SPICE (IN) | DIAMETER ACROSS FLATS (IN) | |
| | | | | @ TOP | @ BOTTOM |
| 1 | 36.75 | 0.1875 | 42.00 | 14.000 | 23.500 |
| 2 | 49.13 | 0.2500 | 57.00 | 22.289 | 33.938 |
| 3 | 49.37 | 0.3125 | | 32.311 | 44.000 |

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPICE. PLATE LOCATION AND AN EXTRA LONG "SPICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:

- (A) INSTALL NEW STIFFENERS AT BASE PLATE. SEE SHEET S-5.
 (B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

| NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE | | | | | | | | | | | |
|--|---------------|----------------------------|-----------------|----------------|------------------|------------------------------------|--------------------------------------|----------------------------|-------------------------|-----------------------------------|------------------------------|
| BOTTOM ELEVATION | TOP ELEVATION | FLAT # / DEGREE SEPARATION | ELEMENT | ELEMENT LENGTH | ELEMENT QUANTITY | APPROXIMATE AJAX BOLTS PER ELEMENT | APPROXIMATE TOTAL AJAX BOLT QUANTITY | TERMINATION BOLTS (BOTTOM) | TERMINATION BOLTS (TOP) | MAXIMUM INTERMEDIATE BOLT SPACING | ESTIMATED TOTAL STEEL WEIGHT |
| 16'-3" | 75'-3" | F3 F5 & F15 | 6 1/2" x 1 1/4" | 30'-0" | 3 | 37 | 111 | 11 | 11 | 19' | 2148 LBS |
| 76'-4" | 105'-4" | F3 F5 & F15 | 6" x 1" | 32'-0" | 3 | 38 | 114 | 10 | 10 | 16' | 1838 LBS |
| | | | | | | | 225 | | | | 4326 LBS |

NOTES:

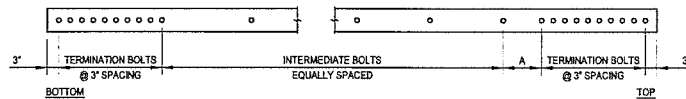
1. AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE
2. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY MINIMUM OF TWO COATS OF ZRC-BRAND ZINC RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION
3. ALL REINFORCING SHALL BE ASTM A572 OR 65
4. WELDS SHALL BE E60XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS
5. HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE
6. ALL SHIMS SHALL BE ASTM A36

| SPICE PLATE INSTALLATION CHART | | | | | | | |
|--------------------------------|----------------------|------------------|-------------------|---------------------|----------------------|-------------------|-----------------------|
| ELEVATION | FLAT PLATE THICKNESS | FLAT PLATE WIDTH | FLAT PLATE LENGTH | FLAT PLATE QUANTITY | WELD LENGTH PER SIDE | TOTAL WELD LENGTH | AJAX BOLTS PER SPICE* |
| 76'-4" | 1-1/4" | 6-1/2" | 6'-10" | 3 | 0" | 0" | 21 |
| | | | | | | 1" | 484 LBS |

*BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

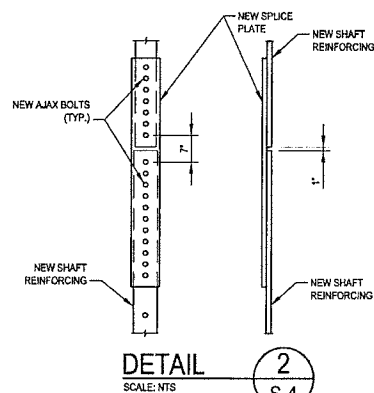
| NEW SHIM CHART | | | | |
|---------------------|--------------------|------------|-------------|---------------|
| 1/16" SHIM QUANTITY | 1/4" SHIM QUANTITY | SHIM WIDTH | SHIM LENGTH | HOLE DIAMETER |
| 9 | 0 | 6" | 4" | 1-1/4" |

SHIM INFORMATION IS FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL VERIFY SIZES AND QUANTITIES PRIOR TO FABRICATION.



BOLTED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING



DETAIL

SCALE: NTS

2
S-4

POLE ELEVATION

1
S-4

PROJECT: 38914-0012.004.7700

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CHECKED BY:
K.M.M.
APPROVED BY:

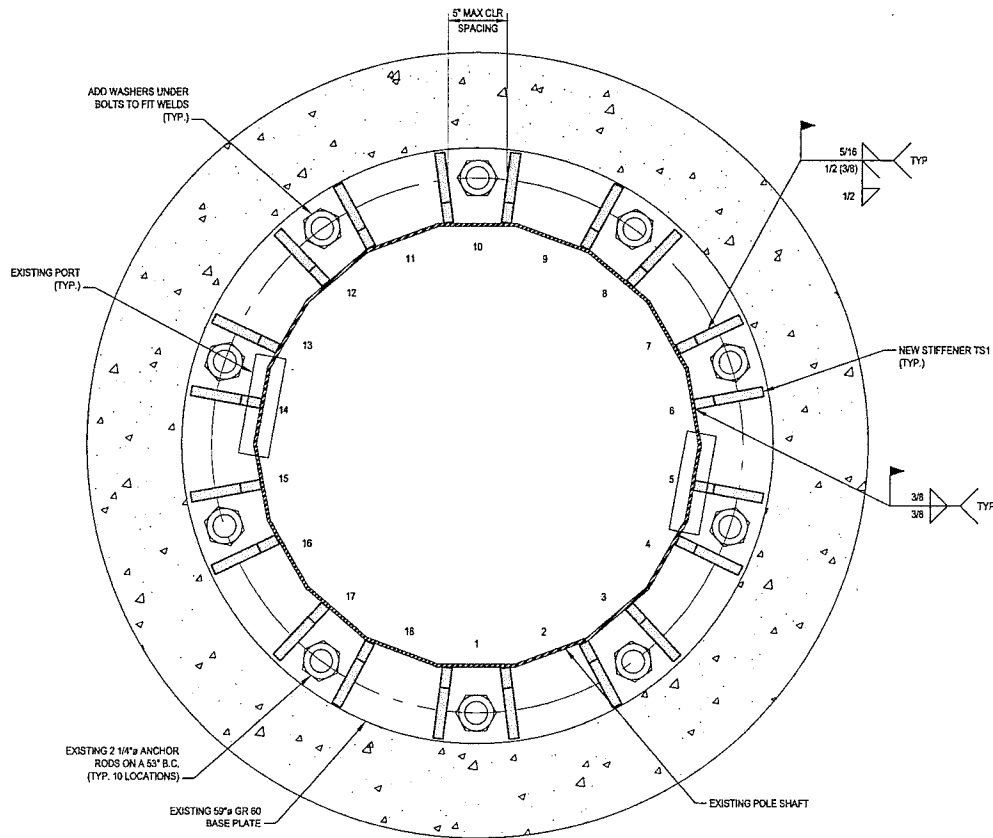
MONOPOLE PROFILE

DATE:
9-17-2014

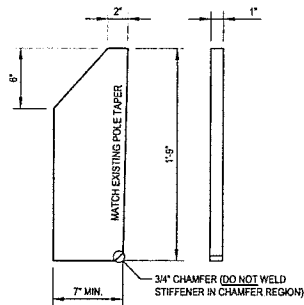
S-4

SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS

- (1) PRIOR TO CONSTRUCTION, CONTRACTOR'S INSPECTION AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE CONTRACTOR'S INSPECTION AGENCY SHALL USE THE FOLLOWING INSPECTION METHODS AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. CONTRACTOR SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
- (2) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD WELDS AND FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE (1) ABOVE.



BASE PLATE 1
S-5



STIFFENER MK-TS1
(20 REQUIRED) (F_y = 50 KSI)

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K.M.M.

APPROVED BY:

DATE:

9-17-2014

BASE PLATE DETAILS

S-5

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

SITE NAME

SITE #CLMB118; AVERY & 33

SITE ADDRESS

**1979 WEST DUNDEE RD.
DUBLIN, OHIO 60067
FRANKLIN COUNTY**

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS WAS NOT AVAILABLE AT THE TIME OF THIS DESIGN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. NOTIFY THE EOR AND UNITED ACQUISITION SERVICES IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED.
4. **DTI'S REQUIRED:** ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
5. THE INTENTION OF THESE DESIGN DOCUMENTS IS TO PROVIDE SUFFICIENT DETAILS AND SPECIFICATIONS SUCH THAT AN EXPERIENCED CONTRACTOR AND/OR FABRICATOR CAN PRODUCE FABRICATION DRAWINGS AND CONSTRUCTION DRAWINGS FOR THEM.

PROJECT CONTACTS:

CLIENT CONTACT:

UNITED ACQUISITION SERVICES, INC
3960 BROWN PARK DRIVE, SUITE I, HILLIARD, OH 43026
CONTACT: MATT MORGAN
PH: (614) 850-8966

STRUCTURAL ENGINEER OF RECORD (EOR):

PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: KEVIN MAHLUM AT KMAHLUM@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE ANSI/TIA-222-G-2-2009 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 90 MPH (3-SEC GUST) WITH NO ICE, 40 MPH WITH 3/4 INCH ICE AND 60 MPH SERVICE LOADS, EXPOSURE CATEGORY C.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#38914-0012.004.7700), DATED 9-17-2014.

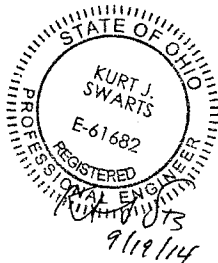
THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

FIELD WELDED STIFFENERS

SHEET INDEX

| SHEET NUMBER | DESCRIPTION |
|--------------|--------------------|
| T-1 | TITLE SHEET |
| S-1 | GENERAL NOTES |
| S-2 | GENERAL NOTES |
| S-3 | AJAX BOLT DETAIL |
| S-4 | MONOPOLE PROFILE |
| S-5 | BASE PLATE DETAILS |



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B.M.S.

CHECKED BY:

K.M.M.

APPROVED BY:

TJD

DATE:

9-17-2014

TITLE SHEET

T-1

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VERIZON WIRELESS PROJECT: SITE #CLMB118; AVERY & 33; DUBLIN, OHIO
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY VERIZON WIRELESS. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF VERIZON WIRELESS AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
- THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA-222-G BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
- IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
- THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL OWNER'S CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES.
- THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
- ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
- ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
- ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

- ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
- OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
 - ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
 - THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
- THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND CONSISTENT WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL

- PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)

C. CONCRETE TESTING PER AISC - (NOT REQUIRED)

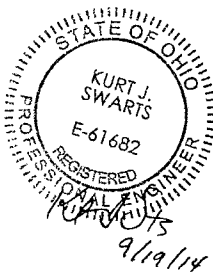
D. STRUCTURAL STEEL

- CHECK THE STEEL ON THE JOB WITH THE PLANS.
 - CHECK MILL CERTIFICATIONS.
 - CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
 - CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
 - CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
 - CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
- #### E. WELDING:
- VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
 - INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
 - APPROVE FIELD WELDING SEQUENCE.
 - A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
 - INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
 - INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
 - VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - REVIEW THE REPORTS BY TESTING LABS.
 - CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. REPORTS:

- COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

- THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
- AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
- RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



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SITE #CLMB118; AVERY & 33
DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 38914-0012.004.7700

DRAWN BY:
B.M.S.

CHECKED BY:
K.M.M.

APPROVED BY:
T.S.D.

DATE:
9-17-2014

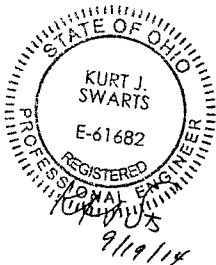
GENERAL NOTES

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- D. STRUCTURAL STEEL**
- STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
 - BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
 - "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
 - "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
 - "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
 - BY THE AMERICAN WELDING SOCIETY (AWS):
 - "STRUCTURAL WELDING CODE - STEEL D1.1."
 - "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
 - ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
 - TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
 - WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 - STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
 - UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
 - ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
 - NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 - FIELD CUTTING OF STEEL:
 - PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
 - ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
 - ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
- E. BASE PLATE GROUT - (NOT REQUIRED)**
- F. FOUNDATION WORK - (NOT REQUIRED)**

- G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**
- H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**

- I. TOUCH UP OF GALVANIZING**
- THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATINGS IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
 - THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.
- J. HOT DIP GALVANIZING**
- HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
 - PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
 - DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
 - ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.
- K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
- AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
 - THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
 - THE OWNER SHALL REFER TO TIA-222-G, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TIA-222-G SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".



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GENERAL NOTES

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APPROVED BY:
T.J.D.

DATE:
9-17-2014

S-2

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH RED DURABLE SQUIRT MEDIA EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

PART NUMBER: 2DTIM208MGAFSIF

DESCRIPTION: P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

DISTRIBUTOR CONTACT DETAILS:

ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

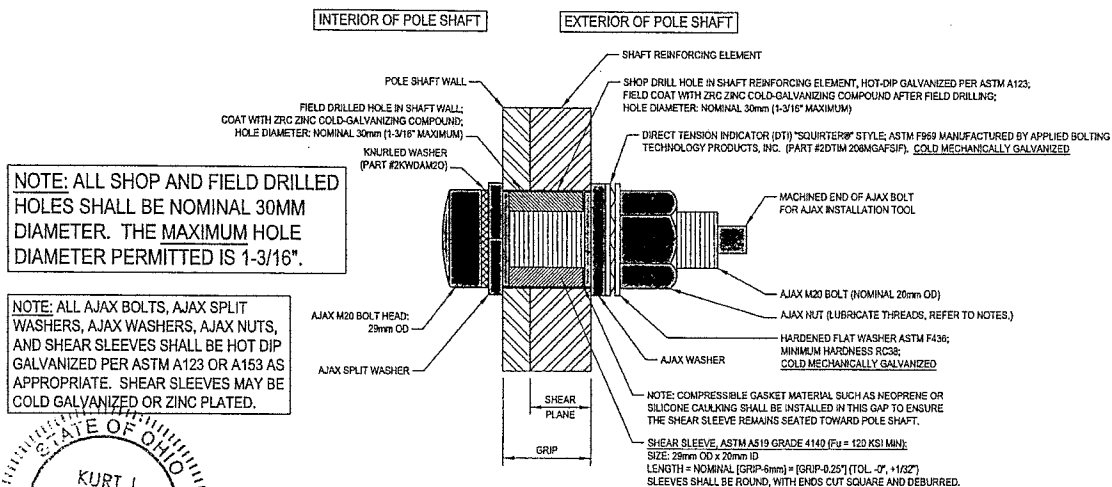
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

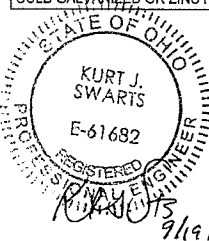
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



TYPICAL AJAX BOLT DETAIL 1
S-3



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SITE #CLMB118; AVERY & 33
DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 39914-0012.004.7700

| | |
|------------------------------------|------------------|
| DRAWN BY: B.M.S. | AJAX BOLT DETAIL |
| CHECKED BY: K.M.M. | |
| APPROVED BY: <i>[Signature]</i> | S-3 |
| DATE: 9-17-2014 | |

| POLE SPECIFICATIONS | |
|---------------------|-------------------------|
| POLE SHAPE TYPE: | 16-SIDED POLYGON |
| TAPER: | 0.23675 IN/FT |
| SHAFT STEEL: | ASTM A572 GRADE 65 |
| BASE PL STEEL: | ASTM A871 GRADE 60 |
| ANCHOR RODS: | 2 1/4" |
| | #18J ASTM A615 GRADE 75 |

| SHAFT SECTION DATA | | | | | |
|--------------------|---------------------|----------------------|----------------|----------------------------|----------|
| SHAFT SECTION | SECTION LENGTH (FT) | PLATE THICKNESS (IN) | LAP SPICE (IN) | DIAMETER ACROSS FLATS (IN) | |
| | | | | @ TOP | @ BOTTOM |
| 1 | 39.75 | 0.1875 | | 14.000 | 23.500 |
| 2 | 49.13 | 0.2500 | 42.00 | 22.289 | 33.938 |
| 3 | 49.37 | 0.3125 | 57.00 | 32.311 | 44.000 |

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND AN EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:

- (A) INSTALL NEW STIFFENERS AT BASE PLATE. SEE SHEET S-5.
 (B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

| NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE | | | | | | | | | | | |
|--|---------------|---------------------------|-----------------|----------------|------------------|------------------------------------|--------------------------------------|----------------------------|-------------------------|-----------------------------------|------------------------------|
| BOTTOM ELEVATION | TOP ELEVATION | FLAT #1 DEGREE SEPARATION | ELEMENT | ELEMENT LENGTH | ELEMENT QUANTITY | APPROXIMATE AJAX BOLTS PER ELEMENT | APPROXIMATE TOTAL AJAX BOLT QUANTITY | TERMINATION BOLTS (BOTTOM) | TERMINATION BOLTS (TOP) | MAXIMUM INTERMEDIATE BOLT SPACING | ESTIMATED TOTAL STEEL WEIGHT |
| 45'-3" | 75'-3" | F3, F9 & F15 | 6 1/2" x 1 1/4" | 30'-0" | 3 | 37 | 111 | 11 | 11 | 19' | 2488 LBS. |
| 75'-4" | 105'-4" | F3, F9 & F15 | 6" x 1" | 30'-0" | 3 | 39 | 114 | 10 | 10 | 16' | 1938 LBS. |
| | | | | | | | 225 | | | | 4326 LBS. |

NOTES:

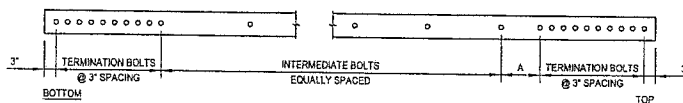
- 1) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 20mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
- 2) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
- 3) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
- 4) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
- 5) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
- 6) ALL SHIMS SHALL BE ASTM A36.

| SPLICE PLATE INSTALLATION CHART | | | | | | | | |
|---------------------------------|----------------------|------------------|-------------------|---------------------|----------------------|-------------------|------------------------|--------------------|
| ELEVATION | FLAT PLATE THICKNESS | FLAT PLATE WIDTH | FLAT PLATE LENGTH | FLAT PLATE QUANTITY | WELD LENGTH PER SIDE | TOTAL WELD LENGTH | AJAX BOLTS PER SPLICE* | TOTAL STEEL WEIGHT |
| 75'-4" | 1-1/4" | 6-1/2" | 6'-10" | 3 | 0" | 0" | 21 | 484 LBS. |
| | | | | | | | | 484 LBS. |

*BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

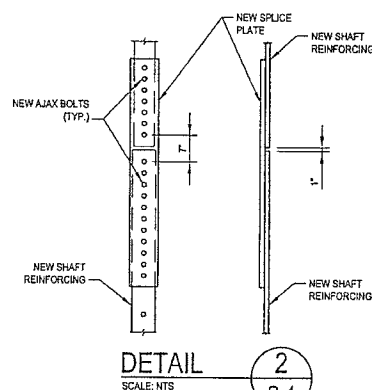
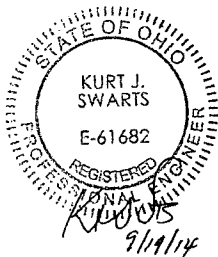
| NEW SHIM CHART | | | | |
|---------------------|--------------------|------------|-------------|---------------|
| 1/16" SHIM QUANTITY | 1/4" SHIM QUANTITY | SHIM WIDTH | SHIM LENGTH | HOLE DIAMETER |
| 3 | 0 | 5" | 4" | 1-1/4" |

SHIM INFORMATION IS FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL VERIFY SIZES AND QUANTITIES PRIOR TO FABRICATION.



BOLTED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING

DETAIL
SCALE: NTS2
S-4POLE ELEVATION 1
S-4

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DUBLIN, OHIO
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 38914-0012.004.7700

DRAWN BY:

B.M.S.

CHECKED BY:

K.M.M.

APPROVED BY:

TSD

DATE:

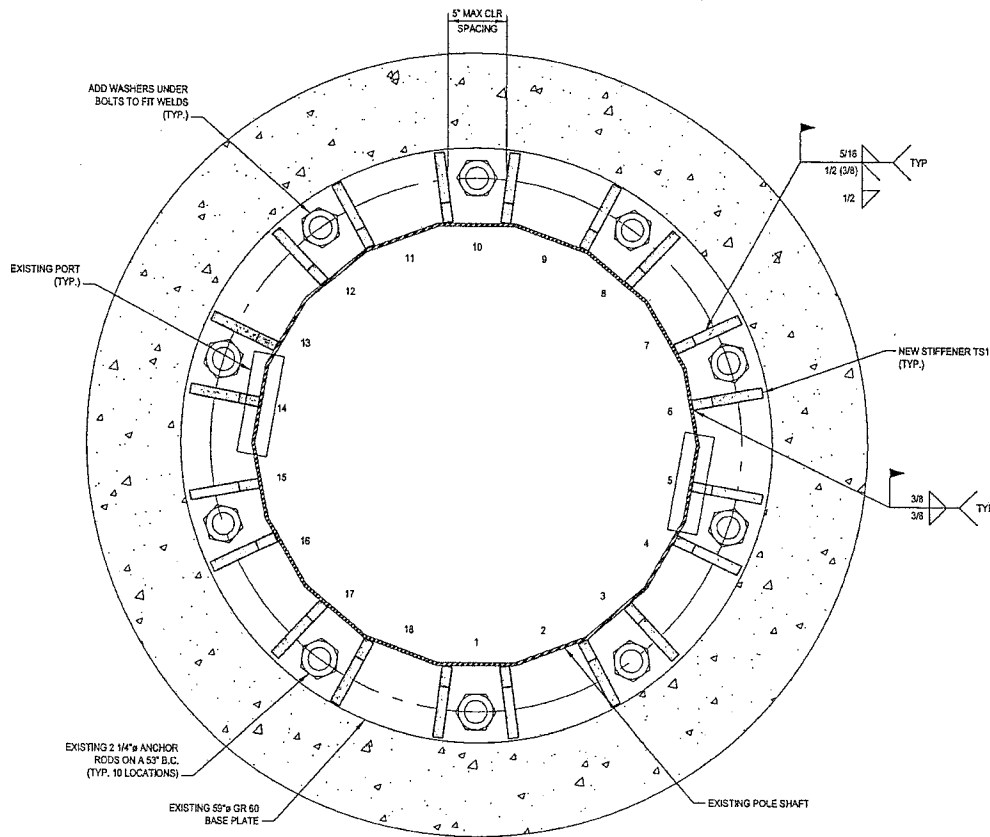
9-17-2014

MONOPOLE PROFILE

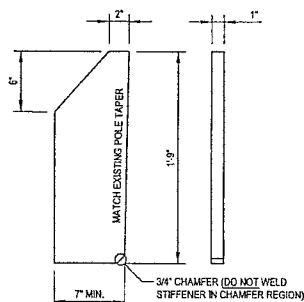
S-4

SPECIAL INSPECTION OF EXISTING SHAFT-TO-PLATE WELD CONNECTIONS:

- (1) PRIOR TO CONSTRUCTION, CONTRACTOR'S INSPECTION AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE CONTRACTOR'S INSPECTION AGENCY SHALL USE THE FOLLOWING INSPECTION METHODS AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. CONTRACTOR SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
- (2) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD WELDS AND FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE (1) ABOVE.

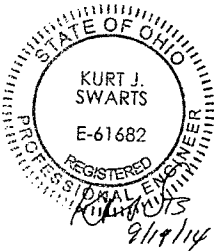


BASE PLATE 1
S-5



STIFFENER MK~TS1

(20 REQUIRED) (F_y = 60 KSI)



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K.M.M.

APPROVED BY:

T.S.D.

DATE:

9-17-2014

BASE PLATE DETAILS

S-5

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